

**Training week TEAM – LCPC  
Paris-Nantes, October 5-8, 2010  
« Traffic loads on infrastructures, Extreme loads, Weigh-in-motion, Fatigue »**

The LCPC, partner of the TEAM (Training in European Asset Management) Marie Curie project, will organize a short training week on October 5 to 8, 2010, in Paris and Nantes. This training week is open to: (i) the PhD students of the TEAM project, (ii) the PhD students with LCPC involved in the topics described below.

The topics of this training week will be:

(T1) traffic loads (measurements, WIM, models, extrapolation)

(T2) applications of traffic loads to pavement and bridge engineering (load effects, extreme load effects, wear models vs. various limit states and deterioration processes)

(T3) fatigue models, calculation and testing (pavements and bridges)

(T4) probabilistic approaches and reliability, infrastructure management and re-assessment using WIM data

Presentations on these topics will be made by: (i) TEAM PhD supervisors and partners, (ii) young and senior researchers by LCPC, (iii) some external French experts (from companies, consultancies and/or universities). The TEAM PhD students involved on the above topics will be invited to make brief presentations on their work.

The presentations will be either on scientific methods and tools useful for the PhD students, or on application and experiences to illustrate the implementation of such methods for pavements and bridges.

The program will include visits of the LCPC testing facilities in Paris and Nantes, and a technical visit of the bridge of Saint-Nazaire (on the Loire river, close to the Sea).

The scientific organization will be supervised by Bernard Jacob.

Bridge contacts: François Toutlemonde, Christian Tessier and Bruno Godart.

Pavement contacts : Pierre Hornych, Jean-Michel Piau

Support to the organization : Valérie Fournier (Paris), Nathalie Juignet (Nantes).

Registration fees: the PhD students are required to pay a registration fee of 350 € (to be paid on their TEAM budget) to cover the organization expenses. These fees include all the meals (lunches and dinners) from Tuesday until Friday noon, the return ticket Paris-Nantes and the bridge visit to St Nazaire, and cover some organisation expenses.

## **Final Programme (as on Sept. 30<sup>th</sup>)**

*The time allocated for each speaker includes Q/A and discussion.*

**Monday Oct. 4<sup>th</sup>** (afternoon/evening): early arrivals to Paris, free evening

### **Tuesday Oct. 5<sup>th</sup> (LCPC, 58 bd Lefebvre, 75015 Paris, room J001)**

9:00 – 9:15: Welcome Coffee

9:15 – 9:30: Introduction, General Information (Bernard Jacob, LCPC)

#### **B2. Traffic loads, WIM, load models and Eurocode 1991-2, extrapolation**

9:30 – 10:00: Traffic Loads Measurements using WIM and Modeling (B. Jacob, LCPC)

10:00 – 10:30: Statistical Tools for Making Predictions (Colin Caprani, DIT)

10:30 – 10:50: Traffic Load Extrapolation and extreme Values (Dominique Siegert, LCPC)

10:50 – 11:15: Eurocode 1991-2 Load Models (Anne-Sophie Colas, SETRA)

11:15 – 11:30: Coffee Break

11:30 – 12:15: PhD Student Presentations (Alessandro Lipari, Mark Treacy, Xiao Yi Zhou)

12:15 - 12:30: Load Effect Assessment and Bridge Formula (Maryam Moshiri, F. Schmidt)

12:30 – 13:00: General Discussion

13:00-14:00: Lunch hosted by LCPC

#### **B4/B1.**

14:00 – 14:20: Orthoplus Project (UHPFRC + steel orthotropic deck bridges) (Pierre Marchand, LCPC)

14:20 – 14:40: On-going Experimental Research Works on Infrastructure Management  
(François Toutlemonde, LCPC)

14:40 – 15:15: Visit of the Structure Large Testing Plate-Form (F. Toutlemonde, P. Marchand)

15:15 – 15:30 : Coffee Break

#### **B3. Fatigue of steel and composite bridges, inspection and maintenance, Eurocode 1993**

15:30 – 15:55: Probabilistic Approach of Fatigue and Applications (B. Jacob, LCPC)

15:55 – 16:20: Optimization of Steel Bridge Inspection Strategies considering Fatigue (André Orcesi, LCPC)

#### **B6. Applications**

16:20 – 16:50: Railway bridges experience (Bernard Plu, SNCF)

16h50-17h10: Movies on Millau Bridge Construction

#### **17:10 – 17:30: General Discussion on B3 & B6**

17:30 – 17:50: Presentation of the LCPC (Patrick Mallejaq or Sylvie Proeschel, LCPC)

**20:00-22:30: TEAM dinner in Paris (restaurant La tentation des gourmets, Paris 14)**

### **Wednesday Oct 6<sup>th</sup> (LCPC Paris, room B430)**

#### **B1.**

9:00-9:30: Presentation of the Bridge Research at LCPC (Bruno Godart)

#### **B7. Bridge monitoring and instrumentation**

9:30 – 9:50: Structural Health Monitoring: from Data Acquisition to optimal Maintenance Strategies  
(A. Orcesi, LCPC)

9:50-10:10: Advanced Techniques for Bridges Instrumentation and Monitoring (François Derkx, LCPC)

#### **B6. Applications (cont'n)**

10:10 – 10:40: Company Experience and Millau Bridge Construction (Claude Servant, Eiffage Group)

#### **10:40-10:55: Discussion, Q/A**

11:00: Departure from LCPC to Gare Montparnasse

**11:55-14:14: TGV Paris to Nantes (lunch in the train)**

## **Wednesday Oct 6<sup>th</sup> (LCPC Nantes, room R210)**

14:45 – 15:00: Welcome Coffee

### **P1. General introduction**

15:00 – 15:30 : by Jean-Michel Piau (LCPC, Nantes)

15 :30-16 :00 : Company perspectives (Bernard Heritier, Eiffage Group) – *by videoconf.*

### **P2. Deterioration mechanisms : rutting, fatigue**

16:00 – 16:20: In situ Behaviour (Jean-Pierre Kerzreho, LCPC)

16:20 – 16:40: Laboratory Behaviour (Ferhat Hammoum, LCPC)

16:40 – 17:10: PhD Student Presentations : (Zhangli Wang, Cinzia Maggiore)

17:10– 17:30: General Discussion

17:30 – 19:30: City of Nantes Tour

19:30 – 20:00: Hotel Check-in

**20:00 – 21:30: Dinner in Nantes (restaurant Pont-Levis)**

## **Thursday Oct 7<sup>th</sup> (LCPC Nantes, room R210)**

8:15: Bus leaves from the Railway Station (South Exit)

### **P3. Surface deterioration: ravelling, polishing and skid resistance**

9:00 – 9:20: On site Experience (Jean-Pierre Kerzreho , LCPC)

9:20 – 9:40: Skid Resistance, on site and Laboratory Experimentations (Malal Kane, LCPC)

9:40 – 9:50: Discussion

### **P4. The French pavement design method and advanced models**

9:50 – 10:45 : Pierre Horny, Jean-Michel Piau (LCPC, Nantes)

10:45 – 11:00: Discussion

11:00-11:15: Coffee Break

### **P5. Impacts of traffic loads**

11:15 -11:35: Impacts of Heavy Vehicles on Pavements (H. Pham-Doan, SETRA)

11:35 - 12:30: Student Presentations (Donya Hajializadeh, Farah Homs, Dermot Casey)  
Diagnosis and maintenance strategies

12:30 - 13:30: Lunch hosted by LCPC

### **B5. Instrumentation, monitoring and fatigue of cables**

13:30 -14:00: Fatigue of Cables (Christian Tessier, LCPC)

14:00 -14:20: Fretting Fatigue Corrosion (Virginie Perier, LCPC)

14:20 -14:40: Monitoring of Cables (Laurent Gaillet, LCPC)

14:40 -15:10: Eurocode 1993 and Fatigue Design (Joël Raoul, SETRA) – *by videoconf.*

15:10 – 15:30 : General Discussion

15:30 – 17:30: **Visit of LCPC Nantes testing facilities**

Pavement Fatigue Test Track (Pierre Horny)

Pavement Materials Laboratory

Reference Track for Characterization of Pavement Surfaces

Cable Fatigue Testing Bench

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**18:00-22:00: Technical Visit (“Machines de Nantes”) and Dinner**

## **Friday Oct 8<sup>th</sup> (Saint-Nazaire + LCPC Nantes, room 210)**

7:30-8:30: Bus from Nantes to Saint-Nazaire

8:30-12:45: Technical presentation and visit of the bridge of Saint-Nazaire (cable stayed bridge – main span 404 m, steel orthotropic deck 720 m, total bridge length 3356 m, 52 simple supported pre-stressed concrete spans of 50.70 m for the approaching viaducts -, 68 m over the Loire river nearby the sea).

Visit kindly organized by the General Council 44.

8h30 : Welcome and coffee at the Operation Center in Trignac

8h45-10h15: Presentations on the bridge construction, maintenance and repairs  
(Philippe Griaud, CG44 – Bridge Operation Center)

10h15-10h30: Transfer on the bridge by mini-bus

10h30-11h45: Visit of the deck and cable anchorage, steel box and south abutment  
(from inside the box)

11h45-12h30: Visit of the North concrete approaching viaduct piers and the on-going  
repairs

12h30-12h45: Transfer to the restaurant by mini-bus

### **12:45 - 14:00: Lunch at Restaurant Le Débarcadère (Saint-Brevin)**

14:00-15:00: Bus back to the LCPC

15:00 -15:20: Fatigue of external prestressing Cables of Boulonnais Viaducts (Lamine Dieng, LCPC)

15:20 -15:35: Fatigue of orthotropic Deck : Orthoplus (L. Dieng, LCPC)

15:35 -16:00: Conclusions and Q/A on Bridges (C. Tessier, LCPC)

16:00 - 16:30: Conclusions and Q/A on Pavements (J-M. Piau, LCPC)

16:45: bus leaves LCPC to the station

**17:30-19:30 : TGV back to Paris**